

## A.4.2 SWMU 8

### Description

SWMU 8 was identified based on the indicated presence of the burials on the Refinery Leaded Burial Map. SWMU 8 consists of two suspected 20-foot by 20-foot TEL sludge burials located at the northern end of the EYB. SWMU 8 is located northeast of Tank Basin 773 near the northern property boundary. It is approximately 150 feet west of the Arthur Kill.

As summarized on Table A.4.1 and shown on Figure A.4.1, 17 borings, 34 soil samples and two water samples have been used to characterize this SWMU. In addition, relevant data from SWMU 25 and AOC 6C are also shown on Table A.4.1 for delineation purposes. A total of eight borings were installed during the 1st-Phase RFI, and seven soil samples were analyzed for lead and TOL; three samples were also analyzed for VOCs and SVOCs. During the full RFI, 27 soil samples were collected from nine borings to further characterize this SWMU. Of these, 12 samples were analyzed for TCL VOCs and SVOCs; 15 samples were analyzed for BTEX; six samples were analyzed for PAHs; one sample was analyzed for TAL metals; 20 samples were analyzed for lead; and 27 samples were analyzed for TOL. Two samples were also analyzed for SPLP lead and physical characteristics.<sup>1</sup>

### Soils

SWMU 8 is a confirmed TEL site, where concentrations as high as 2,400 mg/kg of TOL and 145,000 mg/kg of lead were detected during the 1st-Phase RFI. The maximum concentration of TOL detected in January 2003 was 220 mg/kg. Likewise, lead has been found at concentrations as high as 91,900 mg/kg at this SWMU during the Full RFI. VOCs, PAHs and other SVOC compounds have also been detected above soil delineation criteria at SWMU 8. In all samples where there were exceedances of soil delineation criteria for VOC and/or SVOC compounds, benzene and/or benzo(a)pyrene were also detected above applicable soil delineation criteria.

The following table summarizes the number of samples where delineation criteria were exceeded:

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<sup>1</sup>Physical characteristics specified in Appendix A, Task IV of Module III of the HWSA Permit included saturated and unsaturated permeability tests, moisture content, relative permeability, bulk density, porosity, soil sorptive capacity, CEC, TOC, pH, Eh and grain size distribution.

Compound	Surface Soils (0 to 2 ft) (9 samples)	Fill Material (>2 ft) (21 samples)	Native Soils (4 samples)	Total (34 samples)
Benzene	0/9	6/18	0/4	10/31
Other VOCs	0/9	2/18	0/4	2/31
Benzo(a)pyrene	1/6	1/16	1/4	5/20
Other SVOCs	0/4	1/16	0/4	2/20
Lead	3/7	4/17	1/4	8/28
TOL	2/9	4/21	1/4	7/34

### Surface Soils

Although surface soils do not appear to be heavily impacted based on analytical results, benzo(a)pyrene, lead and TOL were detected above delineation criteria in samples collected from the zero to two-foot layer. Benzo(a)pyrene was detected slightly above the soil delineation criterion in soil sample S0827A3 (0.68 mg/kg). TOL was also detected above the soil delineation criterion in S0827A3 (125 mg/kg), as well as in S0829A4 (2.9 mg/kg). Lead was also detected above the applicable soil delineation criterion in the same sample from S0829A4 (3,210 mg/kg), as well as in S0830A4 (1,940 mg/kg) and S1415A4 (1,190 mg/kg).

### Fill Materials (>2 feet bgs)

The lithologic descriptions on the boring logs indicate that visual evidence of petroleum impacts was noted at six of the borings, and evidence of petroleum staining, odors and/or PID readings greater than 100 ppm in the fill material were noted at 10 other borings. The thickness of the fill layer ranges from approximately nine to 14 feet in the vicinity of SWMU 8. Measurable NAPL has not been detected at this SWMU.

Benzene was detected above applicable soil delineation criteria in six subsurface fill samples<sup>2</sup>. Although SB0076SD (6 to 8 feet bgs) had 750 mg/kg in November 1995, the most recent samples from the immediate vicinity of SB0076 only had 1.5 mg/kg (S0830D3 at 7 to 7.5 feet bgs) and 5.3 mg/kg (S1415C3 at 5 to 5.5 feet bgs), indicating that benzene in the fill soils has significantly decreased in the past seven years at this SWMU.

Benzo(a)pyrene was detected above the soil delineation criterion in two samples (S0830D3 and SB0076). Bis(2-ethylhexyl)phthalate (1,300 mg/kg) was detected above applicable delineation criterion in one sample (S0827C2). The presence of bis(2-ethylhexyl)phthalate could be an artifact of sampling and/or analytical procedures, as this compound is found in many plastics. Naphthalene (180E mg/kg) and 2,4-dimethylphenol (250E mg/kg) were detected above the delineation criteria in a saturated fill sample (SB0076SD). However, as this sample was collected from the saturated zone, the

<sup>2</sup>Benzene was also detected in four other saturated soil samples at concentrations ranging from 1.3 to 2 mg/kg. However, as these samples were collected from the saturated zone, the IGWSCC (1 mg/kg) is not applicable, and these concentrations are below the RDCSCC for benzene (3 mg/kg).

IGWSCC (100 mg/kg and 10 mg/kg) are not applicable, and these concentrations are below the RDCSCC (230 mg/kg and 1,100 mg/kg, respectively). Thus, for these constituents, the soil impacts are vertically delineated.

Lead and TOL were also detected in four soil samples above their respective delineation criteria. The maximum concentrations of both lead (145,000 mg/kg) and TEL (2,400 mg/kg) were detected in the 1st-Phase soil sample from SB0076. During the Full RFI, the maximum concentration of TOL (220 mg/kg) was found at S1415C3, and the maximum concentration of lead (91,900 mg/kg) was found at S0830D3. The SPLP sample from S0830D3 contained 0.68 mg/L of lead, which exceeds the applicable criteria for SPLP lead (0.11 mg/L)<sup>3</sup>. These results indicate that lead associated with the TEL processes is leachable and may be a source to groundwater.

### Native Material

A clay/peat layer underlies the fill material in this part of the Refinery. In general, the peat layer is approximately 10 to 20 feet bgs. A clay layer extends to at least 24 feet bgs. Benzo(a)pyrene was detected slightly above the delineation criterion in one of the samples of native material (S0827L4, 23.5 to 24 feet bgs), and TOL (13.2JB mg/kg) and lead (15,900 mg/kg) were detected above applicable soil delineation criteria in S0830H4 (15.5 to 16 feet bgs), which was collected from the peat layer immediately underlying the fill.

### Groundwater

HP0103 was installed during the 1st-Phase Groundwater Investigation. The sample from this hydropunch contained benzene (69 µg/L) above the delineation criterion, as well as other VOCs (chlorobenzene, 1,4-dichlorobenzene and benzenethiol). Lead was also detected at 839 µg/L; however this sample was collected using traditional hydropunch methodology and is not considered to be representative of ambient groundwater conditions.

Monitoring well MW-132 was installed in 2002, and analytical data from November 2002 indicate that a number of constituents are present above the applicable groundwater delineation criteria, including benzene (700 µg/L), naphthalene (310 µg/L), methyl-tert-butyl ether (150 µg/L), and arsenic (37 µg/L) and lead (172 µg/L). Further discussion of groundwater impacts can be found in Section 8 of the RFI Report.

### Summary

In summary, SWMU 8 is a confirmed TEL burial site. A number of constituents, including benzene, benzo(a)pyrene, lead and TOL are present at concentrations above their respective delineation criteria at SWMU 8. The greatest impacts are found within the fill layer, although it appears that the underlying peat may have been impacted at one location. The impacted area (based on analytical results for lead and TEL/TOL) is

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<sup>3</sup>Based on the groundwater criterion for lead (10 µg/L), DAF = 11.

approximately 50 feet by 75 feet. This SWMU has been adequately delineated. Based on the analytical results from MW-132, it is probable that groundwater has been impacted by this SWMU. Therefore, SWMU 8 will be included for further evaluation in both the soils and site-wide groundwater portion of the CMS.